

€ TRAINING

Combined Cycle Power Plant Operation





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Introduction:

A Combined Cycle Power Plant Operation training program teaches the operation and maintenance of combined cycle power plants, focusing on gas and steam turbine operation, heat recovery systems, and efficiency optimization. Participants gain skills to manage plant operations, troubleshoot issues, and ensure safe electricity generation.

Program Objectives:

At the end of this program the participants will be able to:

- Design and evaluate combined cycle power plant thermodynamic cycles.
- Select the most appropriate strategies for evaluating performance.
- Choose the right size and design for your combined cycle power plant.
- Examine the economics and the LCOE.
- Analyze the Environmental Effects.
- Learn how to operate and maintain your equipment properly.
- Simulation and prediction of power plant performance.

Targeted Audience:

- Engineers.
- Managers.
- Top and Middle Management.
- Project Developers and Owners.
- High-Level Power Plant Technicians O&M.
- Process Plant Technical Professionals: Engineers, Technicians, and Operators.

Program Outlines:

Unit 1:

Thermodynamic Basics:

- Fundamentals of Thermodynamic Laws and Gas Turbine Cycles.
- Ideal Open and Closed Gas Turbine Cycles.
- Introduction to Different Power Plant Technologies.
- Combined Cycle Power Plant Energy Resources.
- ISO Rating: The Impact of Elevation and Environmental Conditions on the Performance of Combined Cycle Power Plants.
- Brayton Cycle Actual Performance.
- Cycle Analysis with Variable Properties.

Unit 2:

Components of Combined Cycle Power Plant:

- Filtration of the air.
- Compressor for air.
- Types, Pollution Control, and Monitoring of Combustion Chambers.
- Sizing of Gas and Steam Turbines.
- Steam Generator with Waste Heat Recovery HRSG.
- Performance of Steam Turbines.
- Heat Dissipation System.
- Control Systems.

Unit 3:

Improve Plant Performance:

- Efficiencies of Components.
- Improving the Performance of Simple and Combined Cycle Power Plants.
- Operation Mode: Simple Cycle vs. Combined Cycle.
- STEG Operation and Maintenance Scheduling of Combined Cycle Power Plants: Steam Turbine Selection and Performance.

- NOx emissions reduction.
- Part Load Performance and Control for Inlet Air Cooling and Mist Systems.

Unit 4:

Economics & Hybridization:

- Solar thermal and nuclear energy are combined with simple and Combined Cycle Power Plants.
- Learning Curves in Technology and Future Trends.
- Combined Cycle Power Plants' Economic Impact.
- Plant placement.
- Environmental Impact Assessment.

Unit Five:

Case Study & Simulation:

- Software for simulation and modeling.
- Performance Simulation of a Combined Cycle Power Plant.
- Financing for a project.
- Evaluation of the Electricity Levelized Cost LCOE.
- Environmental Impact Assessment.